

the user must insert his module 20 into the receptacle of a resident unit 62, and keyboard enter his PIN. Only if the PIN is correctly keyboard entered does the lock open. Upon entry, the module records place and time of entry and stores that data in memory. Meanwhile, the resident unit requires the PIN of the individual having authorized entry as well as the time of entry. Upon exit, the user must reinsert his module 20 into the receptacle of resident unit 62. The time as well as place of the exit is stored in the memory of module 20. Both portable module 20 and resident unit 62 thus carry an "audit trail" of access times, personnel (unit 62) and place (module 20).

The resident unit 62 may be on-line with the central computer whereby the identity and status of the user requesting access to the secured area are verified upon departure from the area. The on-line system may authorize exit only if the user has receive a "clearance" based upon information maintained in memory at the central computer.

Periodically, such as at the end of the week, the user may place his module 20 on-line to the central computer at a resident unit 62, such as at his home telephone, to download his work-time or location-time records. The user will, again, keyboard his PIN to enable the unit 62 to handshake with the central computer. The work-time or location-time records transmitted to the central computer are stored in the particular "account" assigned to the user prior to sign off. Computations may be provided at the central computer to determine compensation as a function of the number of hours worked as well as of the particular hours, and a compensation check may be mailed to the user, virtually without any human intervention.

Radiation Dosage Data

Operation of the modules 20 and resident units 62 of the invention in a radiation dosage monitoring application involves monitoring radiation using a suitable radiation probe. As one possibility, the amount of sunburn a user is likely to receive is determined by measuring instantaneous ultraviolet radiation using an ultraviolet radiation probe (not shown) within or connected to module 20 (see probe port 23 in FIG. 1(b)). This measurement may be taken at predetermined intervals, such as at one minute intervals. The instantaneous reading of ultraviolet radiation, together with the time, is applied to the memory of module 20, together with the particular time of the reading. Both data are stored in corresponding memory locations.

There are now two possibilities of data read out. The first is to simply accumulate radiation dosage readings as a function of time and to energize an alarm (not shown) when the accumulated, or integrated, radiation dosage reaches a predetermined amount which may be tailored to the particular user's sensitivity. The second possibility is to download the dosage and time data to the central computer using the resident unit 62, to establish a radiation dosage profile in monitoring radiation dosage of workers in a high radiation zone, such as in proximity to a nuclear reactor. The data would be used for, among other purposes, restricting exposure of workers to radiation by limited accumulated dosage, or to help construct cause-effect data for medical research.

We claim:

1. An electronic fund transfer system for enabling financial transactions to be carried out between either local or remote users, comprising a plurality of micro-

processor controlled modules, each one of said modules including a housing carrying a display and a keyboard for manually entering electronic funds data, said housing containing microprocessor controlled circuitry including a memory, and a first optical interface coupled to the circuitry and extending through the housing to transfer electronic funds data bidirectionally directly with another one of said modules with said modules positioned adjacent each other with said first interfaces thereof in registration, and a plurality of resident units, each of said resident units including a housing having a receptacle to receive one of said portable modules and a second optical interface in said receptacle positioned in optical registration with the first interface of one of said modules seated in said receptacle to couple electronic funds transfer data bidirectionally with said one of said modules seated in said receptacle, said resident unit further including means for transferring data bidirectionally onto external communication lines; and means for controlling electronic funds data transfer bidirectionally (1) directly between local portable modules via only said first optical interfaces thereof or (2) between remote portable modules, indirectly, along external communication lines through the resident units and via said first and second optical interfaces thereof.

2. An electronic funds transfer system for enabling financial transactions to be carried out between either local or remote users, comprising a plurality of microprocessor controlled modules, each one of said modules including a housing carrying a display and a keyboard for manually entering funds transfer data, said housing containing microprocessor controlled circuitry including a memory, and a first optical interface coupled to the circuitry and extending through the housing to transfer electronic funds data bidirectionally with another one of said modules with said modules positioned adjacent each other with the first interfaces thereof in optical registration, and a plurality of resident units, each one of said resident units including a housing having a receptacle to receive one of said portable modules and further having a second optical interface in said receptacle positioned to be in registration with one of said modules seated in said receptacle for bidirectional electronic funds data transfer with a module seated in said receptacle, said resident unit further including means for transferring data bidirectionally onto external communication lines, and data protocol means in each of said microprocessor controlled modules for automatically determining whether said each of said modules is (1) in direct communication with another of said modules via only said first optical interfaces thereof or in indirect communication via said first and second optical interfaces thereof with another of said modules through resident units in which said modules are seated or (2) in communication with a resident unit.

3. The system as defined in claim 2, wherein each of said resident units includes means for generating an alternating binary code identification signal, and each of said portable modules includes means responsive to said alternating code signal for making said resident unit identification.

4. A system for accumulating and transferring data between either local or remote users, comprising a plurality of portable modules, each of said modules including a housing carrying a keyboard for manually entering data and a display, said housing containing microprocessor controlled circuitry including a memory, and a first optical interface external to said housing for cou-